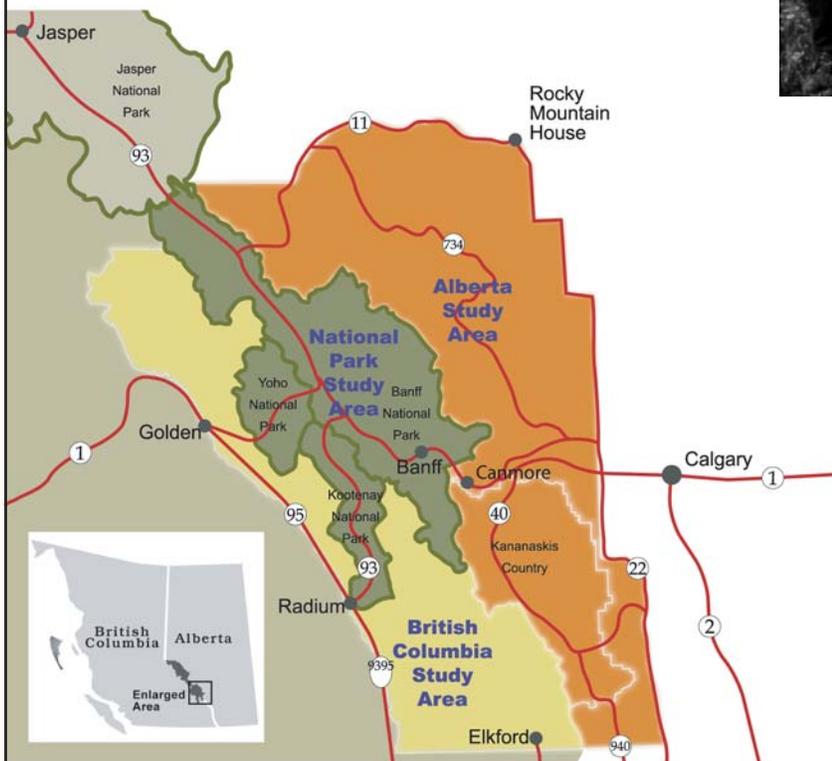


# CHAPTER 1

## THE EASTERN SLOPES GRIZZLY BEAR PROJECT AND SCIENCE-BASED GRIZZLY BEAR CONSERVATION



# 1. THE EASTERN SLOPES GRIZZLY BEAR PROJECT AND SCIENCE-BASED GRIZZLY BEAR CONSERVATION

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Maintaining grizzly bear (*Ursus arctos*) populations and the habitat needed to support them is one of the best known, most researched and yet most challenging conservation issues in Canada and the United States. In the contiguous western United States extensive grizzly bear habitat that remained by about 1850 subsequently became very fragmented by human settlement. By 1920 most of the remaining grizzly bear populations were in the hundreds or fewer and isolated from one another. Human-caused mortality then resulted in extirpation of all but the largest, more northern, populations in the United States (Storer and Tevis 1955, Brown 1985, Mattson and Merrill 2002). Of 37 grizzly bear populations that survived in 1922, only 6 were left by 1975 (Servheen 1999). Grizzlies lost a significant portion of their range in North America (Figure 1) and most of their range in the contiguous United States (Figure 2). This and low population numbers in the contiguous United States led to the species being classified in 1975 as threatened under the Endangered Species Act of 1973.

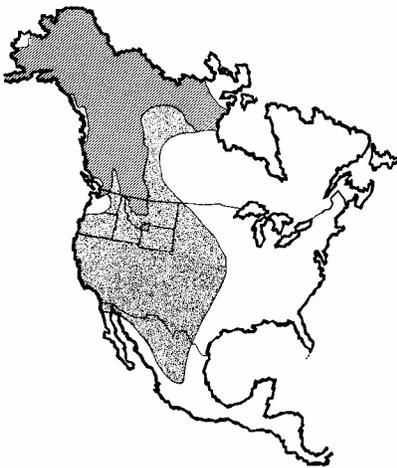


Figure 1. Current (darker) and historic (ca. 1800) distribution of grizzly bears in North America. Adapted from Servheen (1990) by Ross 2002.

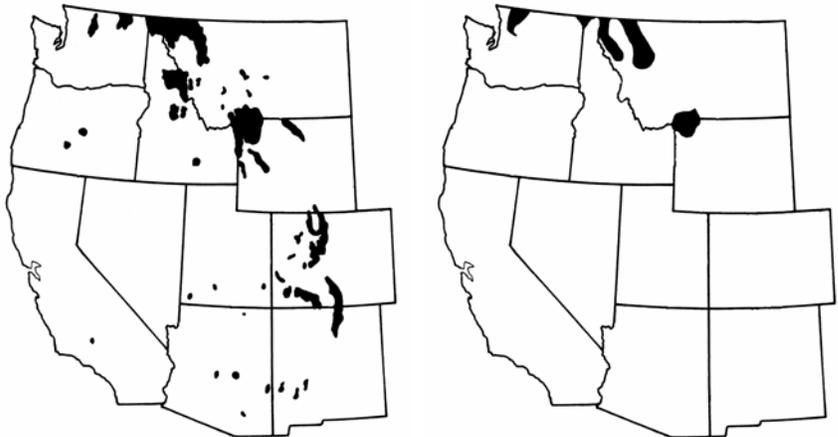


Figure 2. Estimated distribution of grizzly bears in the contiguous lower 48 United States in 1922 (left) and 1999 (right). From Merriam (1922) and Servheen (1990, 1999a) by Ross 2002.

In Canada grizzly bears have maintained more of their range and population but have been extirpated from prairie and some foothill and boreal environments and productive, large valleys in southern British Columbia (Figure 3) (McLellan 1998). Much of the grizzly bear range in southern Canada, including that of the grizzly bears in our study, is now peninsular or island in shape (Figure 4) (McLellan 1998).



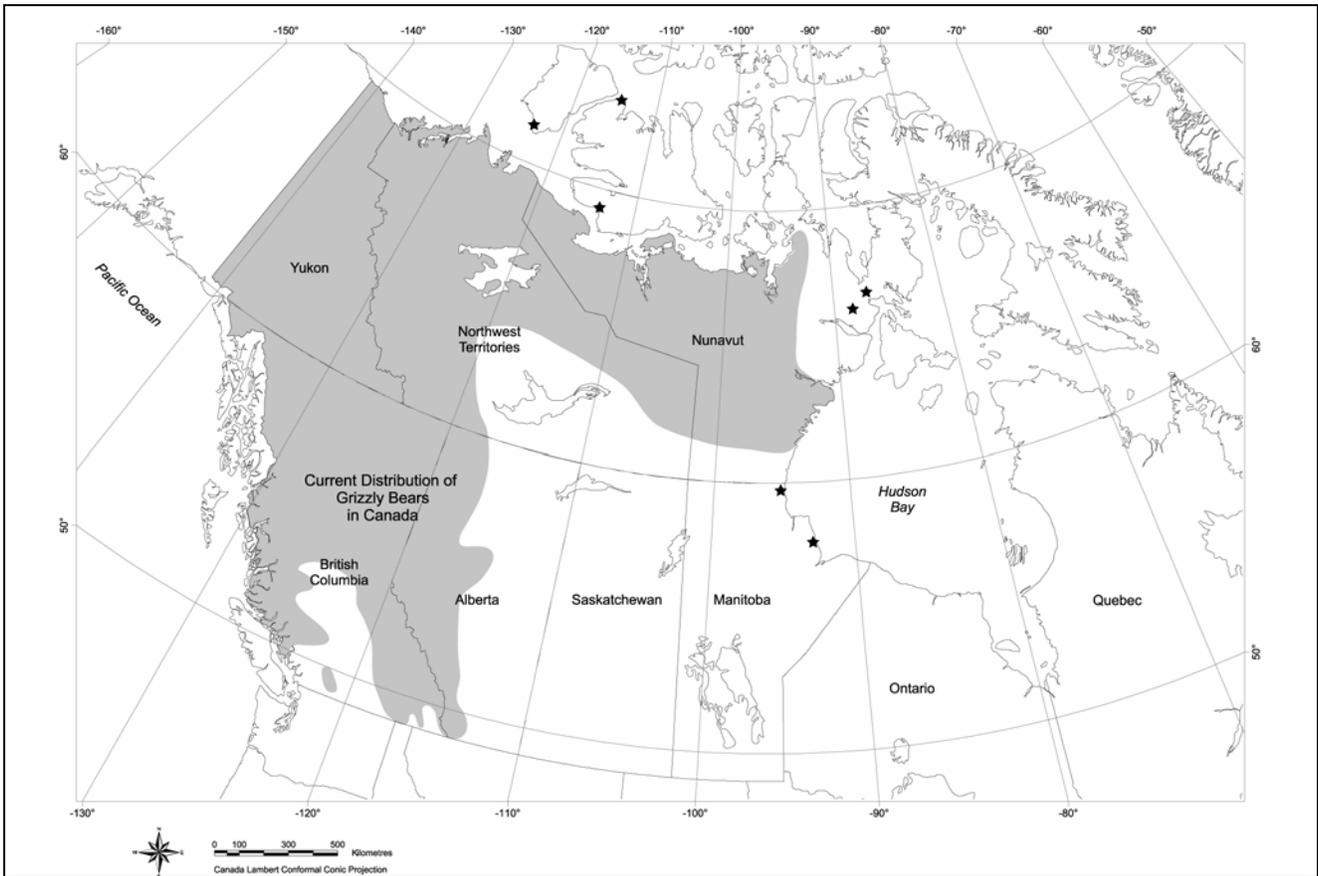


Figure 3. Current distribution of grizzly bears in Canada. Confirmed observations outside of normally-occupied range are identified by stars, by Ross 2002.

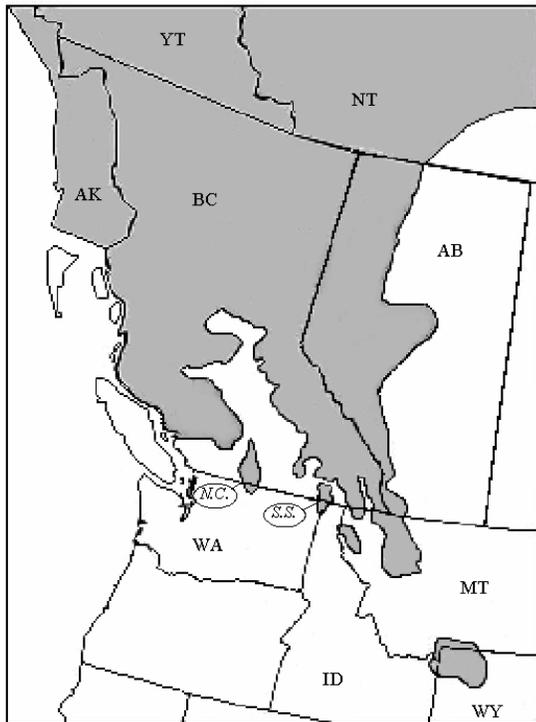


Figure 4. Approximate current distribution of grizzly bears in southwestern Canada (after McLellan 1998). Locations of North Cascades (N.C.) and South Selkirks (S.S.) population units are marked. Historic (ca. 1800) distribution included all mainland areas shown, by Ross 2002.



Peninsular shaped ranges of grizzly bears have extensive fringe and hence contact with humans thus increasing mortality probability. Island populations are isolated from one another, are often small, and subject to extirpation. Remaining habitat along the southern fringe of grizzly bear distribution in Canada is becoming increasingly fragmented by a combination of highways, human settlement and human-caused grizzly bear mortalities (Proctor et al. 2002, Proctor 2003, Proctor and Paetkau 2004). Extant Canadian grizzly bear populations in Canada are classified by the Committee on the Status of Endangered Wildlife (COSEWIC) as being of “special concern” (Ross 2002). The most endangered are 8 isolated grizzly bear populations in southern British Columbia (Ross 2002). In each case the cause of population isolation and endangerment has been human development that did not take into account grizzly bear populations.

The biological nature of grizzly bears, their so-called life history traits, interacting with people’s propensity to occupy or use grizzly bear habitat and to kill grizzly bears, are the root cause of the challenge of maintaining populations. The species evolved to have relatively slow rates of population growth set by late age of first reproduction, small litter sizes, and long interbirth intervals. These biological characteristics are amplified in interior mountain populations. Here grizzly bears are smaller than are coastal bears of the same species. Interior grizzly bears typically live in areas of low natural food production compared to coastal areas (Ferguson and McLoughlin 2000). They also experience high year to year variability in the production of key fattening foods such as berries (Hamer and Herrero 1983: p. 108) or whitebark pine nuts (Mattson et al. 1994). This variability apparently selects for later age of maturity, longer interbirth interval, and potentially greater longevity (Ferguson and McLoughlin 2000). These traits have evolved to match reproduction to past environmental characteristics. High levels of human-caused mortality are something grizzly bear reproduction is not adapted to.

Low biological resilience is a major life history trait that makes grizzly bear conservation challenging in the face of population and habitat fragmentation and accompanying higher rates of human-caused mortality. Resilience is the ability of a system to absorb disturbance and still maintain basic structure and function (Holling 1973). Weaver et al. (1996) applied this concept to three hierarchical levels of organization of grizzly bears. Individual grizzly bears have some flexibility of diet but because grizzlies are part of the mammalian order Carnivora they have fast acting, non-specialized digestive systems, and they need to eat foods such as young green vegetation, berries, or meat that are quick to digest (Mealey 1980, Hamer and Herrero 1983). When readily digestible foods are not available energetic stress follows. At the population level there is little or no conclusive evidence of a significant reproductive increase or increased survivorship by young grizzlies to compensate for increased mortality (McLellan 1994). Because of this grizzly bear populations recover slowly from human-caused decline and then only if causal circumstances are alleviated. High adult female survival, greater than 92% each year, has been found for all Rocky Mountain populations estimated to be stable or increasing (McLellan 1989, Wielgus and Bunnell 1994, Eberhardt et al. 1994, Weaver et al. 1996). The third hierarchical level where grizzly bears show low resilience is at the metapopulation level. In nature, isolated animal populations may be linked by dispersal thus increasing their ability to recover after population decline. However, grizzly bear females show strong fidelity for their home ranges and young females typically disperse slowly over a period of years and usually less than the diameter of their mother’s home range (McLellan and Hovey 2001). Dispersing young females must be able to live and survive in an area in order to disperse through it. Female grizzly bears south and north of the Highways 3 and 3a in southern Alberta and British Columbia appear to be almost completely isolated from one another because young females cannot survive over multiple years during dispersal (McLellan and Hovey 2001, Proctor et al. 2002).

Along the current southern and eastern edges of grizzly bear distribution in North America, including southern Alberta and British Columbia, human-caused mortality and habitat competition limit grizzly bear populations (McLellan 1998). Here most adult grizzly bear mortality is human-caused. This is true even in places where there is no grizzly bear hunting (Mattson et al. 1996, Benn 1998, McLellan et al. 1999, Benn and Herrero 2002). The probability of human-caused adult grizzly bear mortality is related to the rate of contact with people and the potential lethality of each encounter (Mattson et al. 1996). Along the edges of grizzly bear distribution there often is extensive contact with human beings and our developments. “Theoretically grizzlies could coexist with large numbers of humans if the humans were unarmed, tolerant of



(occasional) injury and competition for resources, and aggregated in the poorest grizzly bear habitat” (Mattson et al. 1996). If this were the case then grizzly bears would not need areas secure from people to survive. Despite low reproductive rates, if mortality does not exceed reproduction, grizzly bear populations will grow to the carrying capacity of the environment. The challenge is maintaining high survival rates for adult females and keeping populations linked into units large enough to persist over time and despite natural and un-natural habitat disturbance. Recent successful recovery and expansion of the Greater Yellowstone Ecosystem grizzly bear population is testimony to what is possible regarding population recovery (Pyare et al. 2004, Schwartz et al. In press).

## **BRIEF HISTORY OF GRIZZLY BEARS IN AND NEARBY BANFF NATIONAL PARK AND KANANASKIS COUNTRY**

Grizzly bears and First Nation peoples have been part of the present day Banff National Park - Kananaskis Country landscape for thousands of years. A historical study of grizzly bears and people in and nearby Banff National Park concluded that indigenous people had little effect on grizzly bear numbers although they did hunt them (Noble 1972: p.19). Introduction of repeating rifles and establishment of markets for grizzly bear hides, meat and trophies changed this. The Hudson’s Bay Company briefly operated a trading post, Bow Fort (Peagan Post), on the north side of the Bow River between Morley and Exshaw. Between August 10, 1832 and January 9, 1833 the HBC account book had entries for 23 large grizzly hides and 10 cub hides (Noble 1972: p. 17, McCrory and Herrero 1982). A few hundred kilometers southeast and in the Cypress Hills, a wooded “island” in the Alberta - Saskatchewan prairie, Hudson Bay Company trader Issac Cowie in 1871 reported a “half-kill” of grizzlies. This numbered 750 hides (Stegner 1962: p. 70).

The establishment of “whiskey posts” at present day High River in 1865 and Calgary in 1870 further expanded markets for grizzly bear and other pelts. Major agricultural settlement of grasslands just east of present day Kananaskis Country and throughout the prairie in the 1880’s was coupled with extirpation of bison and grizzly bears from this biome. Widespread killing of grizzlies, especially by ranchers, continued into the foothills, including eastern portions of present day Kananaskis Country, as cattle ranching expanded (McCrory and Herrero 1982). There was little effective regulation of grizzly bear killing through the 1960s (Nagy and Gunson 1990: p.6, Herrero 1994). By 1970 the Alberta Wildlife Division realized that grizzly bears were declining in the area that was to become Kananaskis Country and that this was caused by excessive human-caused mortality. Grizzly bear hunting was closed in Kananaskis Country in 1970 and has remained so, except for 1987, because of concern for the population.

Limited but ground-breaking biological research on the grizzly bear population in Kananaskis Country took place in the late 1970s and early 1980s. This research was sufficient to establish that grizzly bears in eastern, foothill portions of Kananaskis Country survived only in low densities but westward into the mountains densities were higher. Overall productivity and density of the population was low (Carr 1989, Wielgus 1986, Wielgus and Bunnell 1994).

Present day Kananaskis Country has evolved into a multiple use landscape with road development, tourist facilities, extensive recreational use including ungulate hunting, logging, grazing and oil and gas exploration and development. While many hiking trails were planned to minimize incursion into productive grizzly bear habitat and to help people avoid unwanted encounters with grizzly bears (Herrero et al. 1986), the landscape is becoming more human dominated and the opportunity for grizzly bears to live without contacting people is constrained (Benn 1998, Gibeau 2000, Gibeau et al. 2001).

Banff National Park lies to the north and west of Kananaskis Country and is contiguous with it. Portions of it have been protected since 1885 when Banff Hot Springs Reserve was established. By 1930 the protected area had grown to include most of present day Banff Park and Kananaskis Country. In 1930, with application of the Transfer of Resources Act, the present boundaries were mostly established and today’s Kananaskis Country became the Kananaskis Provincial game reserve (McCrory and Herrero 1982, Herrero 1994). The coming of the Canadian Pacific Railway line in 1883 opened today’s Banff National Park area to more use. Already, by 1887, grizzly bear numbers were probably reduced to “below optimum population levels,” particularly in areas such as the accessible Bow River Valley (Noble 1972: p. 26). While most animals were protected in the park, a 1909 regulation gave the newly formed Warden Service the right “to destroy, when necessary, ‘noxious, dangerous, and destructive animals’ which included the grizzly” (Noble 1972: p. 34).



Despite occasional control killing of grizzly bears, in 1939, well-known biologist C.H.D. Clarke, based on an extensive biological survey he conducted, suggested that the population exceeded 100 (Clarke 1939). While little faith should be placed in the specific numerical estimate, grizzly bears were surviving with Park and Warden Service protection.

While the CPR delivered well off tourists to the Park, the Park opened to the general public in 1915 when automobiles were first allowed. One of the first reported major conflicts between tourism development and grizzly bears occurred in 1936 when 4 grizzly bears were shot at work camp dumps during construction of the Banff-Jasper Highway (Noble 1972: p. 56). By 1969 tourism garbage and its handling were having a significant effect on grizzly bears. Park Naturalist Buck Cunningham reported seeing 23 grizzlies at the Lake Louise Dump during a 6 hour period in fall of 1969 (Noble 1972: p. 88).

Human-caused grizzly bear mortalities within the park were high during the 1960s and 1970s related primarily to removal of problem bears that were used to feeding on people's food and garbage (Benn 1998, Benn and Herrero 2002). The problems caused in Banff Park by grizzly bears becoming used to feeding on people's food and garbage culminated in 1980 when a large male grizzly bear, attracted by garbage at the Caboose restaurant in Banff, fatally injured one person and seriously injured 3 others over a 2 week period (Herrero 1985: p. 65-68, Herrero and Higgins 2003). These tragic events forced Parks Canada to encourage commercial development of bear-proof garbage storage facilities. Grizzly bear mortalities and human injuries associated with poorly stored food and garbage began to decrease by 1984 (Benn 1998, Benn and Herrero 2002, Herrero and Higgins 2003). Many of today's conflicts between grizzly bears and people in Banff Park and Kananaskis Country still involve people's food and garbage serving as attractants. However, the Canadian national parks have become world leaders in bear-proof food and garbage storage. Parallel development of world class, bear-proof, food and garbage storage has also occurred in Kananaskis Country (Herrero et al. 1986).

Today's challenges for grizzly bear survival center around Banff National Park being one of the most developed areas in the world where grizzly bears survive (Gibeau 2000, Herrero et al. 2000) and the over 4 million visitors the park receives each year. High human use also occurs in Kananaskis Country. In surrounding Alberta and BC crown lands people's food and garbage are not as well managed and continue to attract grizzly bears and result in removals or mortalities (Benn 1998, Benn and Herrero 2002). Grizzly bear hunting also occurs in the region on most Alberta and British Columbia crown lands that are not protected areas. Despite a plethora of potential mortality sources for grizzly bears, the bottom line is maintaining human-caused mortality at a level where the grizzly bear population is not declining and having scientifically sound data to know this with an acceptable level of certainty.

## **THE EASTERN SLOPES GRIZZLY BEAR PROJECT**

The Eastern Slopes Grizzly Bear Project (ESGBP) began in 1994 in response to regional development pressures and their potential adverse effects on the vulnerable grizzly bear. The project and its membership evolved from several societal changes (Herrero et al. 1998). In 1988 the government of Canada amended the National Parks Act. Changes included recognition that ecological integrity was the primary objective of national park management. Because grizzly bears are difficult to maintain in landscapes with extensive human use the species' status became an indicator of ecological integrity for Parks Canada. It was also known that grizzly bears were a landscape species and that some individuals moved freely between national park areas and surrounding lands (Russell et al. 1979, Raine and Riddell 1991). As in the United States grizzly bear conservation in national parks was recognized as requiring integrated management with surrounding jurisdictions (Dueck 1990, Herrero 1995).

In 1992 the federal government enacted the Canadian Environmental Assessment Act (CEAA). This broadened the scope of traditional environmental assessment to include the cumulative effects of development at a landscape scale. The following year (1993) the Alberta Environmental Protection and Enhancement Act was passed. This also included a provision for assessing the cumulative impacts of development. Potential landscape scale, cumulative, adverse effects of proposed development on grizzly bears in Alberta became important in evaluating the Westcastle Resort complex (NRCB 1993a) and AMOCO's proposal to drill an exploratory well in the Whaleback (ERCB 1994). Decisions regarding



potential adverse, cumulative effects of these developments on grizzly bears were not able to be informed by empirical data regarding grizzly bears since studies were lacking.

There was also a lack of scientific understanding regarding the status of grizzly bears in Banff National Park, Kananaskis Country and surround. In the early 1990s a major housing and recreational development was proposed on a large tract of privately owned land adjacent to the mountain community of Canmore and a few kilometers from the eastern border of Banff National Park. The recently formed Alberta Natural Resources Conservation Board (NRCB) had a mandate to review large scale recreational developments that could affect natural resources on crown (public) lands. Public hearings were held and submissions received. The scope of the proposed development and its potential adverse effects on grizzly bears became issues around which approval hinged. The Board decided to reject a major portion of the proposed development in the Wind Valley over concerns regarding grizzly bears (NRCB 1993a). This decision was again made with concern for adverse effects on grizzly bears but without empirical data on their status.

The need to be able to predict the cumulative effects of development on grizzly bears was further underlined in 1990 when the Province of Alberta completed its review of the status of grizzly bears (Nagy and Gunson 1990). This documented not only historic declines in numbers, but also unsustainable legal hunting mortality, especially during 1980-1988. Alberta responded by launching a more sensitive, limited entry system for managing grizzly bear hunting.

In 1994 the ESGBP evolved from the foregoing background. Diverse societal elements and individuals were concerned for a variety of reasons about the status of the grizzly bear population and the cumulative effects of development in Alberta and adjacent portions of British Columbia. Documenting and understanding variables influencing grizzly bear population demography and the effects of various human activities on grizzly bears became primary research objectives. The goal was to contribute toward a scientific understanding of grizzly bear biology, ecology and demography in the CRE. This research was intended to inform management, planning and policy decisions that affect grizzly bears. Neither the Project, nor its members, was formally designated by any group or agency. The ESGBP evolved as an association of jurisdiction and deposition holders, and other land users in the grizzly bear's range in the Central Rockies Ecosystem. The principal participants were Parks Canada, the Province of Alberta (Energy and Utilities Board, Fish and Wildlife, Parks, and Kananaskis Country), the Province of British Columbia (Fish and Wildlife), the University of Calgary, conservation, community and recreation groups, the oil and gas industry, the forest products industry, the land development industry, and the cattle industry. The research was carried out primarily by graduate students and was guided by a steering committee composed of primary project supporters, and university supervisory committees (Herrero et al. 1998). The Steering Committee was also responsible for helping to raise funds to support research and some public outreach regarding grizzly bears. Outreach was accomplished primarily by establishing and maintaining a website [www.canadianrockies.net/Grizzly](http://www.canadianrockies.net/Grizzly) and by preparing documents, commercial videos and public events.

## GRIZZLY BEARS AND OUR SOCIETY

During February of 2004 anyone driving west on the Trans Canada Highway toward Kananaskis Country and Banff National Park was guaranteed to see 2 grizzly bears. Each appeared in carefully depicted magnificence on separate, large billboards (Figure 5). One helped advertise Lake Louise, “the home of the grizzly,” another Silvertip, a housing development and “tough” (but high class) golf course built on former grizzly bear habitat in Canmore. Had grizzly bears come of age as symbols of desirability and status, and might this be a fading image like the extirpated grizzly bear on the California State flag?

Most people have strong views about grizzly bears (Kellert 1994). To some they symbolize wild nature and all that is good about intact ecosystems where humans have chosen to manage our actions in order to maintain sensitive species and processes. To others they are undesired predators that sometimes injure, even kill people. To some, because of the land and resources grizzly bears need, they stand in the way of development. Today most people who visit Banff National Park and surround favor grizzly bear conservation (K. McDermid, Banff, Alberta, unpublished data). However, most people are unaware of the complexity of land use and grizzly bear management decisions necessary to provide for grizzly bear population maintenance. To evaluate how to maintain grizzly bears into the future in our rapidly developing region we need to understand the biology and ecology of the regional grizzly bear population and how past



human activities have affected grizzly bears. “The goal of carnivore conservation is to reverse declines in populations and to secure remaining populations in ways that gain enduring public support” (Clark et al. 2001). Designing and implementing successful grizzly bear conservation strategies necessarily involves broad public involvement and support because grizzly bear conservation has wide reaching land use effects that influence the actions of many people in the region.



Figure 5. Billboards on the Trans Canada Highway west of Calgary, Alberta. (credit: Herrero, S., 2004)

Strong arguments can be made for conserving and recovering remaining grizzly bear range and population numbers in our region. From a conservation perspective species have been classified according to a number of criteria (Table 1). Grizzly bears are exceptional because to some extent they meet all of these criteria; they are not perfect indicators for any. Grizzly bear conservation can support broader ecosystem conservation goals but it is only part of larger efforts to live sustainably with nature.

Table 1: Categories of conservation significance for species (Gittleman et al. 2001)

Indicator species	Reflect critical environmental change
Keystone species	Play a pivotal role in ecosystems
Umbrella species	Require large areas and if protected will necessarily protect other species
Flagship species	Popular species that attract attention
Vulnerable species	Most likely to become extinct (or extirpated)

Grizzly bears also fit the mold of extinction prone species (Woodroffe 2001). The history of many extirpated grizzly bear populations in North America is testimony to this. While grizzly bears have been extensively extirpated from portions of their former range in North America (Figures 1,2,3, and 4), they have never been reintroduced into an area where they once lived. This strongly suggests that landscapes and human activities often develop to a point where grizzly bears are no longer socially desirable even where habitat is still suitable to potentially support them. On the hopeful side, for those supporting grizzly bear conservation, some populations have naturally expanded to reoccupy former range (Pyare et al. 2004, Schwartz et al. In press). If we wish to continue to have grizzly bears and the ecosystems needed to support them in the Central Rockies Ecosystem, then the proven formula is to recover and maintain the current population.

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